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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,256	06/01/2001	Kimio Tsunemasu	P/2041-61	4737

7590

08/20/2003

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EXAMINER

OLIVA, CARMELO B

ART UNIT

PAPER NUMBER

2831

DATE MAILED: 08/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,256

Applicant(s)

TSUNEMASU ET AL.

Examiner

Carmelo Oliva

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 26, 2003 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3,8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al. (US 6,225,569) in view of Ueyama et al (US 4,268,614).

Regarding claims 1 and 11, Hashimoto et al. discloses in Figs. 1 and 2, a mounting structure of a printed circuit board (2) in which a semiconductor package (31) is mounted by soldering (33) on a pad (11) of a printed circuit board (1) comprising:

- a pad (11) on a first surface (2a) of a circuit board (2),
- a plating (5) covering the pad and extending to the surface of the board (2),
- a via (3) is formed through the circuit board (2),

However, the via is not said to be connected through the entire thickness of the circuit board to connection wiring on the opposite surface of the board. Ueyama et al. teaches in Fig. 1h a printed circuit board (1) having a pad (2) with plating (7) thereon, a via (4), and connection wiring (also 2) on a second opposite surface of the circuit board (1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the via of Hashimoto et al. connected to wiring on the opposite surface of the circuit board as taught by Ueyama et al. in order to electrically interconnect the component to other electrical components on the circuit board.

Regarding claim 2, the via of Ueyama et al. is annular (see Fig. 4).

Regarding claims 3 and 8, a plating is provided on the pad and via (7) as shown in Fig. 1h.

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5. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al. (US 6,225,569) in view of Ueyama et al (US 4,268,614) as applied to claims 1 and 2 above, respectively, and further in view of Barrow (US 5,796,589).

Regarding claim 4, the modified Hashimoto et al. discloses the structure as applied to claim 1 above, however location of the via is not specified. Barrow teaches a mounting structure of a semiconductor package having vias that correspond to a corner of the semiconductor package (see Fig. 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the vias correspond to corners of the package as taught by Barrow for the purpose of mounting the package to another device and to provide stability, evenness, etc. while mounting the package.

Regarding claim 7, the modified Hashimoto et al. discloses the structure as applied to claim 2 above, however no solder resist is present to provide a space between the resist and the pad. Barrow teaches a mounting structure in Fig. 4 wherein there is a solder resist (42) having a space between it and the pad (20). It would have been obvious to one having ordinary skill in the art at the time the invention was made for the mounting structure to have a solder resist (42) having a space between it and the pad as taught by Barrow in order to prevent cross-wicking between the pads (col. 3, lines 38-40) and to provide additional routing space on the surface of the board (col. 3, lines 42-46).

6. Claims 5,6,9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto et al. (US 6,225,569) in view of Ueyama et al (US 4,268,614) as

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applied to claims 1,3,2 and 8 above, respectively, and further in view of Marrs et al. (US 5,355,283).

Regarding claims 5,6,9 and 10, the via of the modified Hashimoto et al. does not have a truncated cone shape. Marrs et al. teaches a mounting structure wherein the vias (207) have a truncated cone shape (see Fig. 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made for the vias to be a truncated cone shape as taught by Marrs et al. in order to facilitate multiple solder connection on the bottom surface of the circuit board (see Fig. 6)

Response to Arguments

7. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

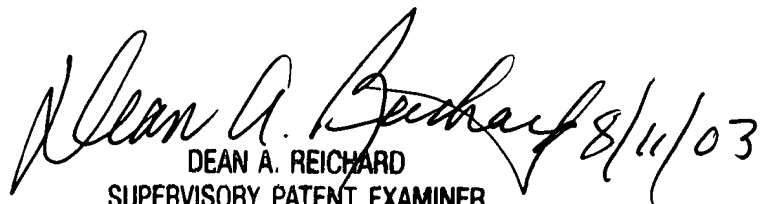
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Murakami (US 6,133,066) shows mounting pads having plating extending to the circuit board. Zhang et al. (US 6,039,889) shows a circuit board having truncated cone shaped vias.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carmelo Oliva whose telephone number is (703)305-0835. The examiner can normally be reached flexible hours on Monday through Friday with every other Wednesday off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard, can be reached on (703)308-3682. The fax phone number for this Group is (703) 305-3431 for regular communications, and (703) 305-1341 for after final communications.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.


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